

**Notice of Allowability**

Application No.

09/993,152

Examiner

Fred Prince

Applicant(s)

KERFOOT, WILLIAM B.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to February 11, 2004.
2. ☒ The allowed claim(s) is/are 13-44 (renumbered as 1-32).
3. ☒ The drawings filed on 25 February 2002 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

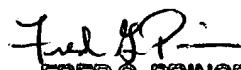
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 0204
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
**FRED G. PRINCE**  
**PRIMARY EXAMINER**  
3/9/04

### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In claim 37, line 12, "reaction;0000" has been deleted and --reaction;-- inserted therefor.

### **REASONS FOR ALLOWANCE**

2. The following is an examiner's statement of reasons for allowance:

Per claim 13, while it is known in the art to provide a process for removing contaminants from a site by performing the steps of injecting gas as bubbles including ozone gas under conditions to break carbon-carbon bonds in the contaminants in the site (see US Pat No 5,167,806 to Wang et al.) and it is known to perform the step of alternating water injection with bubble production (see US Pat No 5,389,267 to Gorelick et al.) and it is known to produce bubbles having a diameter of less than about 200 microns (), in the examiner's opinion, the prior art fails to teach or fairly suggest alternating water injection to provide an even dispersion of bubbles with the contaminants being pulled into the bubbles to decompose the contaminants in a reaction in the bubbles in the presence of water.

Per claims 24 and 41, the prior art fails to teach or fairly suggest a process including the steps of producing or providing microencapsulated ozone to strip volatile

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organics or decompose volatile organics according to a Criegee-like reaction while simultaneously terminating a normal reversible Henry's reaction.

Per claim 37, while it is known in the art to provide an apparatus to remove contaminants from soil and a subsurface groundwater aquifer including a well, a microbubble generator, disposed in the well, to produce microbubbles for extracting contaminants from groundwater in a gas/gas/water reaction, an ozone source coupled to the microbubble generator to produce microbubbles encapsulating ozone to enhance extraction of volatile dissolved contaminants for in-situ decomposition, a pump for forming a pressure wave for assisting in dispersion flow of microbubbles, a co-reactant material to act as co-reactant with ozone in the microbubbles for decomposing the contaminants in the gas/gas/water reaction (see US Pat No 5,167,806 to Wang et al.), in the examiner's opinion, the prior art fails to teach or fairly suggest lateral dispersions for alternating pumping and bubble injection to maximize dispersal of microbubbles within and outward from the well, and to provide a uniform dispersion of the microbubbles as bubbles as they bubbles travel through the site formation.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Prince whose telephone number is (571) 272-

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1165. The examiner can normally be reached on Monday-Thursday, 6:30-4:00; alt. Fridays 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Blaine R. Copenheaver can be reached on (571) 272-1156. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Fred G. Prince*  
FRED G. PRINCE  
PRIMARY EXAMINER  
3/9/04